

## ANOTHER NEW COMET.

THE following letter from Mr. J. R. Hind, dated Mr. Bishop's Observatory, Twickenham, July 27, appeared in Tuesday's *Times* :—

"M. Stephan, Director of the Observatory at Marseilles, notified to us by telegram yesterday the discovery of a comet on the previous night by M. Borrelly, a colleague of M. Coggia (to whom is due the first detection of the bright comet which we have just lost), at that Observatory. The position at 2 A.M. on the 26th inst. appears to have been close to the star Theta, in the constellation Draco, in right ascension 238 deg. 4 min., and polar distance 30 deg. 28 min. The comet is pretty bright, and its motion towards the west. Clouds have prevented any observation at Twickenham during the past night.

"A communication from Berlin this morning mentions—contrary to what I should yet have expected from my own calculations relating to the orbit—that Dr. Tietjen, of the Imperial Observatory, has found indications of a sensible deviation from parabolic motion in the recent bright comet between April 19 and July 14. The curve is elliptical, but the inferred period of revolution is of such length as to be open at present to uncertainty, which can only be removed by observations in the other hemisphere. The semi-axis major is found to be rather more than 430 times the earth's mean distance from the sun, and the corresponding length of revolution is nearly 9,000 years.

"The tail of the late comet increased very quickly and considerably in length, as frequently happens soon after perihelion passage. Assuming it to have proceeded from the nucleus very nearly in the direction opposite to that of the sun, its actual length had increased from 4,000,000 miles on July 3 to 16,000,000 on the 13th, and on the 19th, the last night it was visible in this hemisphere, to something over 25,000,000 miles. The increase of apparent length in this interval was from 4 deg. to 43½ deg."

## NOTES

THE Priestley Centenary is to be celebrated, not only at Birmingham, as we have before announced, but at Leeds, by two meetings, to be held in the hall of the Philosophical Society. The chair will be occupied at the two meetings by Dr. Clifford Allbutt and Mr. Sykes Ward, F.C.S., and addresses are to be given by the Rev. J. C. Odgers, who is to read a paper On the personal history of Priestley; Mr. T. Fairley, F.C.S., On the phlogiston theory; and Mr. S. Jefferson, F.C.S., On the discovery of oxygen.

DR. ACLAND, Regius Professor of Medicine in the University of Oxford, has been appointed president of the Medical Council, in succession to Dr. Paget, of Cambridge. We believe the appointment is a five-yearly one.

At a general meeting of the Council of the Yorkshire College of Science, held last Friday, Dr. T. E. Thorpe was elected Professor of Chemistry. Dr. Thorpe has for the last four years had the direction of large classes in theoretical and practical chemistry at the Andersonian University, Glasgow. He is the author of "A Manual of Inorganic Chemistry" and "A Text Book of Quantitative Chemical Analysis," and has made many original contributions to chemical literature.

THE death is announced of Father Paul Rosa, the colleague of Father Secchi at the Roman Observatory.

THE Select Committee of the Legislative Assembly of New South Wales, which was appointed to inquire into the management of the Sydney Museum, has furnished its report, in which the appointment of a Curator, with complete charge of the property of the Museum, subject to the Minister of Public Instruction, is proposed; at the same time an extension of the building at present holding the collection is suggested.

MR. C. A. BOWDLER's apparatus for steering balloons was tested on Saturday last at Woolwich, in the presence of several officers of the scientific branches of the army. The balloon to which the apparatus was attached was the new large one, 80 ft. high, belonging to Mr. Coxwell, which was considered by Mr. Bowdler too large for the size of his machine. His apparatus is very simple, consisting of fans like the screw propeller of a ship, 3 ft. in diameter, and making 12 or 14 revolutions per second, worked by hand. When the balloon was exactly balanced the vertical fan caused it to rise and fall, but the horizontal fan was found to have no effect whatever in guiding the direction.

THE French National Assembly has adopted the proposal to award to M. Pasteur a pension of 12,000 francs, one half of which reverts to his wife should she survive him.

WE view with great pleasure the advance of the Birkbeck Institution within the last few years in its scientific department. Quite recently a scientific society has been established in connection therewith, the object of which is to inculcate and develop a taste for scientific pursuits among its members, by the reading of original papers upon scientific subjects and by debates, and particularly for the encouragement of the application of scientific principles to the arts and manufactures. In immediate connection with this society we find a Naturalists' Field Club, the aim of which is to organise excursions to the various districts possessing scientific interest, for the purpose of studying practically and under the direction of practical men, those sciences, such as geology, mineralogy, botany, &c., a real and sound knowledge of which can only be obtained by the actual study of Nature. We wish this new undertaking all possible success. As a proof of the high character of the work performed by this institution and the excellence of the instruction provided, we need only call attention to the fact that this year its students have been awarded one half of the total number of prizes offered for public competition by the Society of Arts at its annual examinations.

THE Royal Academy of Belgium proposes the following subjects for prizes to be awarded in 1875 :—1. To examine and discuss, on the basis of new experiments, the perturbing causes which influence the determination of the electro-motive force and the interior resistance of an element of the electric pile; to find out the number of these two quantities for some of the principal piles. 2. To give an exposition of the knowledge attained on the relations of heat to the development of phanerogamous plants, particularly in reference to the periodic phenomena of vegetation; and, in this connection, to discuss the value of the dynamical influence of solar heat on the evolution of plants. 3. To make new researches on the embryonic development of the *Tunicata*. 4. To make new researches to establish the composition and mutual relations of albumenoid substances. 5. To describe the coal-system of the basin of Liège. A gold medal of the value of 1,000 francs is the prize in subjects 4 and 5: one of 600 francs for subjects 1, 2, and 3. The memoirs ought to reach the Secretary of the Academy before August 1, 1875. They must be written either in Latin, French, or Flemish.

THE destruction of vineyards by *Phylloxera*, which has lately so much engaged the attention of entomologists and botanists, was recently the subject of a bill in the French Assembly. Many prefects, on the plea of public welfare, have issued orders for the uprooting and burning of diseased plants, and opposing the introduction of foreign stocks; but to make this desperate course effectual, a special law putting the *Phylloxera* on a level with the rinderpest is necessary. M. Destreux has submitted a bill to make this possible, and the Academy of Sciences gives it its support. Notwithstanding the investigations that have made, no reliable specific against *Phylloxera* seems to have been yet discovered. The bill before the Assembly is received as "urgent."

MR. NEWBIGGING, in his "Handbook for Gas Engineers and Managers," London, 1870, p. 159, gives a "Chronology of Gas Lighting." By this author's statement the first public exhibition of gas in London was in 1807, by Mr. Winsor, who lighted Pall Mall at that time. But Prof. B. Silliman, writing to the *American Gas Light Journal*, gives an extract from the elder Prof. Silliman's "Journal of Travels in England, Holland, and Scotland," containing a description of a public exhibition of illuminating gas from coal in July 1805, by "an ingenious apothecary" in Piccadilly, near Albany House. "The inflammable gas," the journal states, "is extricated simply by heating common fossil coal in a furnace, with a proper apparatus to prevent the escape of the gas, and to conduct it into a large vessel of water, which condenses the bituminous matter resembling tar, and several other products of the distillation that are foreign to the principal object. The gas, being thus washed and purified, is allowed to ascend through a main tube, and is then distributed by means of other tubes concealed in the structure of the room, and branching off in every desired direction, till, at last, they communicate with sconces along the walls, and with chandeliers depending from the roof, in such a manner that the gas issues in streams from orifices situated where the candles are commonly placed. Then it is set on fire, and forms very beautiful jets of flame, of great brilliancy; and from their being numerous, long, and pointed, and waving with every breath of air, they have an effect almost magical, and seem as if endowed with a kind of animation. The gas is sometimes made to escape in revolving jets, when it forms circles of flame—and, in short, there is no end to the variety of forms which ingenuity and fancy may give to this brilliant invention. The expense of the apparatus, and its liability to accidents, forms an obstacle of magnitude, and, on the whole, it is probable it will not be generally adopted." This is curious reading in 1874! Mr. Murdock had employed gas illumination in 1792, and gas was used in Paris in 1802. But London was in the dark until 1805.

DR. MELLICHAMP, of Bluffton, South Carolina, has been prosecuting researches on the pitchers of *Sarracenia variolaris* and the way in which insects are caught in them. The species abounds in this district, and even early in May many pitchers were developed. He has confirmed the presence of the sugary secretion within the rim. He finds that it bedews the throat all the way round the rim, and extends downwards from  $\frac{1}{4}$  in. to  $\frac{3}{4}$  in. Dr. Mellichamp also finds—and this is his most curious discovery—that this sweet secretion is continued externally in a line along the edge of the wing of the pitchers down to the petiole or to the ground, forming a honeyed trail or pathway up which some insects, and especially ants, travel to the more copious feeding-ground above, whence they are precipitated into the well beneath. Ants are largely accumulated in these pitchers. As to the supposed intoxicating qualities of this secretion, Dr. Mellichamp was unable to find any evidence of it. On cutting off the summit of the pitchers and exposing them freely to flies in his house, he found that the insects which came to them, and fed upon the sweet matter with avidity, flew away after sipping their fill, to all appearance unharmed. On the other hand, he thinks that the watery liquid in which the insects are drowned and macerated possesses anæsthetic properties; that house-flies, after brief immersion in it, and when permitted to walk about in a thin layer of it, "were invariably killed—as at first supposed—or at any rate stupefied or paralysed in from half a minute to three or five minutes," but most of them would revive very gradually in the course of an hour or so.

It is probable that a scheme for the establishment of another Medical School at Dacca, on the same footing as those of Calcutta and Patna, will shortly be sanctioned by Government.

THE success which has attended the ostrich-breeding farms in

South Africa has induced some French gentlemen to endeavour to imitate the system in Algeria, and African birds have also been sent to La Plata and other countries in South America, where it is hoped they may take the place of the native birds, which are inferior in quality to the African ostrich. Generally speaking, the system on which ostrich farms are conducted is as follows. The birds kept for breeding purposes, about three years old, are placed in separate paddocks, in pairs, and their eggs are either hatched in the natural way or placed in incubators prepared for the purpose. By this means a larger proportion of eggs is hatched. The young birds are fed on grass, lucerne, and other vegetable matters, and are sheltered at night. Each pair of birds will produce about twenty chickens, which may be plucked when they are about eighteen months old, before which time the feathers are not of much value. The price of good ostrich feathers, wholesale, is about 40*s.* per pound weight. If the birds are well kept, and have plenty of exercise and food, their feathers are of good quality; but the plumage of wild birds is considered superior to that of inferior tame ones. The value of each year's plucking from the young birds is about 7*l.*, and of the birds themselves at six months old is 30*l.* to 35*l.* The breeding birds are worth 125*l.* per pair.

THE new screw steamship *Durham* sailed from Plymouth on Sunday, bound for Melbourne, having on board several members of the Imperial German Astronomical Expedition. They carry with them a large number of instruments with which to observe from Port Ross, one of the Auckland Islands, the coming transit of Venus.

WE have received, reprinted from the excellent Indian ornithological journal *Stray Feathers*, a copy of a lengthy paper by Mr. V. Ball, on the Avifauna of the Chota Nagpur division of Bengal, which, besides giving an account of the birds found in the district, contains an instructive description of its geology, flora, and mammalian fauna; the author laying great stress, as is but too seldom done, on the interdependence between these mutually related phenomena.

THE tenacity of life of popular errors is well exhibited in the following extract from the *Californian Horticulturist*:—"The influence of forests in drawing moisture from the heavens may be seen from the experience of San Diego, California. Previous to 1863 there was yearly a rainy season, which made the soil nourishing and productive. In 1863 a destructive fire swept over the greater part of the country, destroying the forest and blackening the hills. Since then there has been no rainy season at San Diego." When will public writers learn that forests influence the climate by drawing water, not from the air, but from the soil?

AN addition is in preparation to the Colonial Floras published under the authority of our Colonial Government, in the form of a "Flora of Mauritius." It will be edited by Mr. J. G. Baker, assistant-curator to the Kew Herbarium.

PROF. SCHIMPER, of Strassburg, in a paper read before the Botanical Congress at Florence, claims to have discovered a fossil plant in "protogine," a rock hitherto considered of igneous origin, which occurs in the form of erratic blocks on the sides of Mont Blanc and in the plains of Piedmont. The specimen, which was collected by M. Sismonda, and is preserved in the Museum of the Turin University, has been identified by Prof. Schimper as *Annularia sphenophylloides*, a plant, perhaps aquatic, widely distributed in the coal-strata of Mont Blanc.

A DRAWING-ROOM meeting in aid of the Palestine Exploration Fund was held on the 24th inst. at the residence of the Duke of Westminster, Grosvenor House. Capt. Warren, before



giving an account of his experiences, made an appeal to the meeting for increased support to carry on the work of exploration, which was at present flagging for want of funds. He urged the subscribers to the Fund to complete the work of surveying the country as soon as possible, as the land, being so fertile, was constantly being taken by the Greeks and other foreign cultivators of the soil for farming purposes. As a consequence, the old names of the towns and villages were fast disappearing, and the whole country was assuming a different aspect. This meeting was the first of a series that is to be held, information as to which can be obtained of the secretary at the office of the Fund, 9, Pall Mall East.

ACCORDING to the [State geologist of Minnesota, the cretaceous lignite beds of Minnesota Valley are likely to afford valuable coal mines.

IN the report to the Admiralty of Capt. G. S. Nares, of H.M.S. *Challenger*, dated Melbourne, March 25, 1874, Capt. Nares, speaking of the temperature of the ocean, especially near the pack edge of the ice, says:—"At a short distance from the pack, the surface water rose to 32°, but at a depth of 40 fathoms we always found the temperature to be 29°; this continued to 300 fathoms, the depth in which most of the icebergs float, after which there is a stratum of slightly warmer water of 33° or 34°. As the thermometers had to pass through these two belts of water before reaching the bottom, the indices registered those temperatures, and it was impossible to obtain the exact temperature of the bottom whilst near the ice, but the observations made in lower latitudes show that it is about 31°. More exact results could not have been obtained even had Mr. Siemens' apparatus been on board." It seems to us that the difficulty mentioned is one which would certainly have been surmounted by Messrs. Negretti and Zambra's new recording thermometers, a description of which appeared in *NATURE*, vol. ix. p. 387; this being exactly one of the cases to which this instrument is peculiarly adapted. We believe the inventors and makers have greatly improved their thermometer since our description appeared, and no doubt means will be taken by the Admiralty to transmit one to the *Challenger*.

MR. PILLISCHER, optician and scientific instrument maker, of New Bond Street, W., has been decorated by the Emperor of Austria with the golden Cross and Crown of Merit, as are cognation of his Majesty's approval of the superior quality and precision of his scientific instruments shown at the late Vienna Exhibition.

THE following is a list of candidates successful in the competition for the Whitworth Scholarships (Science and Art Department), 1874:—William Martin, metal turner, Wolverton; Robert A. Sloan, engineer's apprentice, Birkenhead; William Sisson, engineer, Gateshead; Frederick Stubbs, engineer's apprentice, Derby; Thomas L. Daltry, draughtsman's apprentice, Newcastle-on-Tyne; Frederick H. Livens, engineer's apprentice, Gainsborough.

THE additions to the Zoological Society's Gardens during the past week include two Tigers (*Felis tigris*) from Calcutta; two Yellow-billed Sheathbills (*Chionis alba*) from the Southern Ocean, presented by Mr. H. Roberts; a Wanderoo Monkey (*Macacus silenus*) from the Malabar Coast, presented by Lieut. Viñan; a Rose-crested Cockatoo (*Cacatua moluccensis*) from the Moluccas, presented by Mr. John Elms; three Grey-breasted Parakeets (*Bolborhynchus monachus*) from Monte Video, presented by Mr. C. Purnchard; a King Vulture (*Gyparchus papa*) from Tropical America; a Red-backed Buzzard (*Buteo erythronotus*) from South America, purchased; a Philantomba Antelope (*Cephalophus maxwellii*) born in the Gardens.

## ON SPECTRUM PHOTOGRAPHY\*

### II.

I NEXT come to a very beautiful reflex action of spectroscopy on photography; and now I must take you back to America. I am nearly certain that everyone in this room is perfectly familiar with the name of Rutherford in connection with celestial photography: if you will allow me I will point my reference to him by throwing on the screen one of his magnificent photographs of the moon, which he was good enough to give me some little time ago. Unfortunately, I am not able to throw on the screen a photograph of the solar spectrum which we owe to him, the most magnificent photograph—and I say it with the intensest envy—which I think it is possible to obtain. However, I have a copy of it on the wall, and it is well worth inspection. Rutherford, whose name is associated with that of Delarue in the matter of celestial photography, was not content with reflectors. He lives in the centre of New York, and I suppose New York is as bad as London for tarnishing everything that the smoke and atmosphere can get at; and he came to the conclusion that he must abstain from celestial photography altogether, or else make a lens—and a lens with Mr. Rutherford means something over 12 in. diameter—which should give him as perfect an image in New York with 15 in. of glass, as a perfect reflector of 15 in. aperture would give him as far away from a city as you please. Mr. Rutherford, who never minces matters, knowing that it was absolutely impossible to get such a lens as this from an optician, who of course neglects almost entirely the violet rays—the very rays which he wanted—in constructing an ordinary telescope, determined to make such an one himself. He thought about the matter, and he came to the conclusion that in any attempt to correct a lens of this magnitude for the chemical rays, the use of the spectroscope would be invaluable. He therefore had a large spectroscope made, in order to make a large telescope, and then we have just as distinct an improvement upon the instruments which we owe to the skill of those who first adopted the suggestion of Sir John Herschel and brought together the chemical and the visual rays, as the improvement we owe to Herschel was upon the instruments which dealt simply with the visible rays. Mr. Rutherford simply discards the visual rays, and brings together the chemical rays; the result of his work being a telescope through which it is impossible to see anything, but through which the minutest star, down I believe to the tenth magnitude, can be photographed with the most perfect sharpness. This is the instrument of the future, so far as stellar astronomy is concerned. Having thus achieved what he wished in the construction of this instrument, and having the spectroscope, Mr. Rutherford commenced a research, which, I am sorry to say, he has never published, for it would be of the greatest value to any photographer or any astronomer amongst us, upon various kinds of collodion and upon the best arrangement of lenses for photographing the spectrum. Mr. Rutherford found that some collodions which he got were so local in their action as to be almost useless for that reason, and that others were so general in their action that they were also almost useless for the exactly opposite reason. I will now throw on the screen the line G and the lines in the green, or rather the lines approaching to the green near F; with ordinary collodions, such as one generally gets, that is to say, collodions not absolutely good, but free from both the extremes referred to by Mr. Rutherford, we want something like five seconds for the part near the line G. Well, when you go a little way along the spectrum in the less refrangible direction, you have to put minutes for seconds—in other words, the exposure has to be sixty times as long. I have another photograph of the spectrum, which will show you the part of the spectrum less refrangible than the line F to which I have referred. This photograph which you see on the screen required an exposure of very nearly half an hour.

Those of you who are most familiar with the solar spectrum will recognise the extreme importance of Mr. Rutherford's contribution to photographic spectroscopy, when I tell you that his photograph of the solar spectrum is quite as admirable and excellent as is the photograph of the moon which I have just shown you on the screen. During the last year this question of the solar spectrum has again been considerably advanced by photography in America. Mr. Rutherford's photographs, admirable although they are, are refraction photographs, that is to say prisms were

\* Continued from p. 112.